

Strengthening climate information and early warning systems for climate resilient development and adaptation to climate change in Guinea Bissau

Part I: Project Information

GEF ID
10105

Project Type
FSP

Type of Trust Fund
LDCF

Project Title
Strengthening climate information and early warning systems for climate resilient development and adaptation to climate change in Guinea Bissau

Countries
Guinea-Bissau,

Agency(ies)
UNDP,

Other Executing Partner(s):

Ministry of Transport and Telecommunications - National Institute of Meteorology

Executing Partner Type

Government

GEF Focal Area

Climate Change

Taxonomy

Focal Areas, Climate Change, Climate Change Adaptation, Climate information, Climate resilience, Disaster risk management, Least Developed Countries, Influencing models, Climate Change Mitigation 0, Strengthen institutional capacity and decision-making, Stakeholders, Private Sector, SMEs, Individuals/Entrepreneurs, Financial intermediaries and market facilitators, Civil Society, Community Based Organization, Local Communities, Beneficiaries, Communications, Behavior change, Awareness Raising, Type of Engagement, Information Dissemination, Gender Equality, Gender results areas, Knowledge Generation and Exchange, Capacity Development, Access to benefits and services, Gender Mainstreaming, Gender-sensitive indicators, Capacity, Knowledge and Research, Knowledge Exchange, Field Visit, South-South, Knowledge Generation, Training, Workshop, Learning, Adaptive management, Climate Finance (Rio Markers), Climate Change Adaptation 2

Duration

48

In Months

Agency Fee(\$)

570,000

Submission Date

10/5/2018

A. Indicative Focal/Non-Focal Area Elements

Programming Directions	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
CCA-1	LDCF	2,125,000	10,000,000
CCA-2	LDCF	2,425,000	20,000,000
CCA-3	LDCF	1,450,000	2,000,000
	Total Project Cost (\$)	6,000,000	32,000,000

B. Indicative Project description summary

Project Objective

To strengthen the climate monitoring capabilities, early warning systems and information for responding to climate shocks and planning adaptation to climate change in Guinea Bissau.

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
1. Transfer of technologies for climate monitoring infrastructure	Investment	1. Enhanced capacity of national hydro-meteorological (NHMS) and environmental institutions to monitor extreme weather and climate change	1.1. Installation or rehabilitation (as appropriate) of 08 Tide Gauge Stations and 17 Limnigraphic stations with telemetry, archiving and data processing facilities 1.2. Procurement and installation and / or rehabilitation of 40 meteorological monitoring stations, with telemetry, archiving and data processing	LDCF	4,085,000	25,000,000

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
-------------------	----------------	------------------	-----------------	------------	----------------	-------------------

facilities

1.3. Procurement and installation of technology using lightning data for monitoring severe weather events.

1.4. Procurement and installation of maritime weather stations (AWS430), maritime observation console (MCC401), MetCast observation console (MCC301) in the 6 ports of Guinea Bissau

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
			1.5. Procurement and installation of 10-days site specific weather forecasting systems in the 12 major towns of Guinea Bissau			
			1.6. Procurement and installation of satellite monitoring equipment to receive real time climate and environmental information			
			1.7. Development and implementation of a capacity building program to provide the Guinea Bissau with the required			

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
			capacity to operate and maintain the purchased equipments			
2. Climate information integrated into priority development plans and early warning systems to support the NAP process	Technical Assistance	2. Efficient and effective use of hydro-meteorological and environmental information for making early warnings and mainstreaming CC in the long-term development plans	2.1. Development of a capacity building and institutional strengthening program to run hydrometeorological models and provide forecast and EW information 2.2. Development of national capacity for integrating climate risk information into existing development planning and disaster	LDCF	1,230,000	6,000,000

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
			management systems			
			2.3. Development of a sustainable financing mechanism for the climate information production and dissemination system			
			2.4. Development of new tailored climate information products for the users in the priority vulnerable sectors and locations (Protected Areas, world importance biodiversity spots, cash and areas			

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
			<p>agriculture, fisheries and natural capital, ...) identified in coordination with the NAP process</p>			
			<p>2.5. Integration of climate risks into the GB 2025 development strategy and related operational programs in coordination with the NAP process</p>			
			<p>2.6. Development of an efficient and sustainable mechanism for sharing climate products products and early warning information</p>			

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
3. Monitoring, evaluation and Knowledge management .	Technical Assistance	Lessons learned by the project through participatory M&E, with special attention to gender mainstreaming, are made available to support the financial sustainability of the strategy	<p>3.1 Project activities and impacts on global, national and local environmental benefits of MPA assessed and monitored.</p> <p>3.2 Project lessons and knowledge codified and disseminated nationally and internationally.</p> <p>3.3 Wider public awareness of climate services available and the benefits of their use achieved through comprehensive multimedia</p>	LDCF	399,286	1,000,000

Project Component	Financing Type	Project Outcomes	Project Outputs	Trust Fund	GEF Amount(\$)	Co-Fin Amount(\$)
			outreach and education campaigns			
				Sub Total (\$)	5,714,286	32,000,000
		Project Management Cost (PMC)		LDC F	285,714	0
				Total Project Cost (\$)	6,000,000	32,000,000

For multi-trust fund projects, provide the total amount of PMC in Table B and indicate the list of PMC among the different trust funds here:

C. Indicative sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount(\$)
Government	National Institute of meteorology	Public Investment	Investment mobilized	1,000,000
Government	Ministry of Agriculture and Rural Development through the Rice Value Chain Development Project (AfDB) and the Economic Development Project for the Southern Regions (IFAD)	Public Investment	Investment mobilized	12,000,000
Government	Directorate of Infrastructures through the World Bank Rural Transport Project (RTP)	Public Investment	Investment mobilized	9,000,000
Government	Ministry of Fisheries through the construction of the Bissau fishing port (China)	Public Investment	Investment mobilized	10,000,000
Total Project Cost(\$)				32,000,000

Describe how any "Investment Mobilized" was identified

Government contributions are indicative figures at this PIF stage and will be further refined during the PPG. 20% of the co-financed amount indicated by the Government has been qualified as recurrent expenditures at this stage.

D. Indicative Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)
UNDP	LDCF	Guinea-Bissau	Climate Change		6,000,000	570,000
Total Project Cost(\$)					6,000,000	570,000

E. Project Preparation Grant (PPG)

PPG Amount (\$)

150,000

PPG Agency Fee (\$)

14,250

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount(\$)	Fee(\$)
UNDP	LDCF	Guinea-Bissau	Climate Change		150,000	14,250
Total Project Costs(\$)					150,000	14,250

Part II. Project Justification

1a. Project Description

Briefly Describe

- a. The global environmental and/or adaptation problems, root causes and barriers that need to be addressed;**
- b. The baseline scenario or any associated baseline Programs;**
- c. The proposed alternative scenario with a brief description of expected outcomes and components of the Program;**
- d. alignment with GEF Focal Area and/or Impact Program Strategies**
- e. Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, CBIT and co-financing;**
- f. global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF); and**
- g. Innovation, sustainability and potential for scaling up.**

Background

Guinea-Bissau consistently ranked among the most vulnerable countries in West Africa. The primary drivers of Guinea-Bissau's climate vulnerability are physical exposure, dependence on agriculture and fishing. Guinea-Bissau is a rural country in which agriculture, forestry, fishing and livestock farming accounted for 49.1% of GDP in 2013[1]. The economic wealth of Guinea-Bissau bases essentially in its natural capital. According to the World Bank (EDMUNDSON, H. 2014) estimation, the total of the country's natural wealth, including minerals as bauxite and phosphate, fishing, wood, fertile lands and rich ecosystems, can reach 3,874 US American dollars per capita. The renewable natural resources, such as agricultural lands (for cultivation and pastures), fishing (traditional, of collection of mollusks, workmanship, industrial and sport), forests (firewood and wood, Non-woody Forest Products, capture of carbon), habitats and protected ecosystems represent more than 90% of Guinea-Bissau wealth[2]. Even by African standards, little industry exists in Guinea-Bissau. Most of the population (about 82 %) work as subsistence farmers[3] in an agriculture sector that is undeveloped and is largely based on rudimentary technology. Furthermore, the agriculture sector is dominated by the cashew nut monoculture. Over the past three years, cashew nuts have dominated Guinea-Bissau's agriculture and national exports. In 2013, cashew nut production generated 11.9% of the country's GDP and cashew sales accounted for 87.7% of total exports. According to the World Food Programme, 80% of those living outside the city of Bissau currently make their living from cashew nuts,

which they use to trade for rice and other staple products. This can lead to a crippling dependence on a single crop for entire communities, putting their livelihoods and even their ability to feed themselves at the mercy of the harvest and of international cashew prices. The fisheries which also plays a vital role for Guinea-Bissau's government, with fees for fishing licenses providing 35 percent of government revenue[4] is also vulnerable to climate change. Climate change is predicted to have adverse effects on fisheries and fishing. Rising sea temperatures, changes in circulation, acidification and loss of nursery areas, are predicted to reduce fish populations. Meanwhile, in places with rich fisheries like Guinea-Bissau, the destruction of coral reefs and mangroves destroys fish spawning grounds, decreasing the availability of fish, limiting the livelihoods of fishermen, and leading to precarious food security.

Additionally, low-elevation coastal zones stands out as Guinea-Bissau's indicator of physical vulnerability. Most of Guinea-Bissau's terrain consists of coastal swamps and mangroves, and over 19 percent of its land area lies in areas less than 10 meters above sea level[5]. Increased flooding and saltwater intrusion due to global sea level rise could potentially affect these areas. Climate change has already begun to affect coastal farmers through saltwater intrusion into their rice paddies[6]. Because of this, farmers who can no longer grow rice have shifted into cashew production[7]. Like many of its West African neighbors, Guinea-Bissau faces rainy seasons and long dry seasons, with abrupt transitions. The West African monsoon that characterizes the region's climate is less stable than its eastern counterpart, and long droughts such as those that affected the area during the 1970s and 1980s are possible[8]. Northern Guinea-Bissau borders the Sahel region. And anecdotal evidence suggests that the long droughts that characterize the Sahel may be spreading to this region[9]. Guinea-Bissau is also subject to climate related disasters risk, such as floods, storms, droughts grasshoppers' attacks, diseases epidemics (cholera, meningitis, and malaria), sea accidents due to increasing sea surges, such as shipwrecks of fishermen canoes that cause significant material damages and loss of lives. In recent years, the following loss data of past decades indicates that Guinea Bissau has experienced an increase both in frequency and in intensity of climate related disasters. For example, i) the epidemic of cholera in 2008 that has affected 105,380 people including 3,032 dead; ii) the drought between 1987 and 2009 that affected 132,000 people; iii) the floods that has affected 1,750 people in 2007, the tropical cyclones caused 2,712 victims in 2009; the locust invasion in 2005[10].

These climatic trends and their impacts observed during these last decades will more likely be exacerbated, according to climate projections. General circulation model (GCM) project an increase in mean annual temperature between 1.1 to 3.0°C by 2060 (SNC, 2011). The IPCC AR 5 (2014) indicates that under a range of scenarios, the Sahel and West Africa are projected to be hotspots of climate change and unprecedented changes in climate will occur earliest in these regions, by the late 2030s to early 2040s. The AR5 projections indicate that temperature in West Africa will rise by between 3°C and 6°C by the end of the 21st century under a range of scenarios. Furthermore, the AR5 projections indicate that many global models indicate a wetter main rainy season with a small delay in the onset of the rainy season by the end of the 21st century. Also regional modelling suggest an increase in more intense and more frequent extreme rainfall events over the Guinea Highlands and Cameroon Mountains. According to the NAPA (2006), INC (2005) and SNC (2011), projections of rainfall suggest an increase in the proportion falling during heavy events, particularly in the late summer and autumn season.

Climate variability and change thus constitute serious challenges for Guinea Bissau's economic growth and development that must be addressed in order for the country to pursue a sustainable development pathway.

Long term solutions and barriers

To allow Guinea Bissau's to better manage climate related challenges undermining economic growth and development, it is essential to address a number of pressing challenges. These include the needs to:

§ enhance capacity of hydro-meteorological services and networks for predicting climatic events and associated risks;

§ develop a more effective, efficient and targeted delivery of climate information including early warnings to both planners as well as communities living on the fringes of climate induced pressures;

§ Support improved and timely preparedness and response to forecast climate-related risks and vulnerabilities.

These objectives require developing in-country robust weather and climate observation capability, including now-casting and forecasting infrastructure which can be rapidly deployed, is relatively easy to maintain, and simple to use. Such a weather and climate monitoring system can provide Guinea Bissau with the capacity necessary to develop: (i) an early warning system for severe weather; (ii) real-time weather and hydrological monitoring; (iii) weather forecasting capabilities (Numerical Weather Prediction); (iv) agro-meteorological information and services (including integrated crop and pest management); (v) applications related to building and management of infrastructure; (vi) tailored products for the mining planning and management; (vii) risk informed land, air and maritime transport management; (viii) integrated water resources management; (ix) adaptive coastal zone and land management; and (x) adaptation planning and policy making processes.

However, there are significant policy, institutional, individual, financial, technological and informational barriers that prevent the desired situation from emerging. These barriers include:

Significant gaps in weather and climate monitoring infrastructure: Data and observation capacity with respect to climate change is limited. The meteorological network of the Republic of Guinea Bissau was only of seven (7) synoptic stations, nineteen (19) agro climatic stations and forty rainfall stations before the politico- military conflict 1998 – 1999. Most of these facilities have been destroyed by the politico- military conflict 1998-1999. Today there are only four Meteorological stations (Bissau Airport, Bissau Centre, Bolama-Bijagós, Bafatá e Gabú) currently operational but unfortunately working with very limited capacity. So there is a critical need for modernizing and expending the meteorological network to collect more and better data in a more automated manner.

Limited knowledge and capacity to effectively predict climate change events and assess their sector/area/community specific potential impacts: The scientific and technical capabilities required to effectively identify climate induced hazards such as storms, flooding, droughts, sea surges and climate induced pest and disease outbreaks and forecast their potential impacts on all Guinea Bissau vulnerable communities such as coastal communities, the farmers and fishermen and others are often weak. This is due to a lack of infrastructure hardware and software, human capacity/skills to program and run the models code, or not effectively using forecasts that are available from regional and international centres. Running forecast models requires specialized education and training that are often lacking. Even when climate information is available (monitoring and forecasts), it is usually not translated into specific hazards experienced by different sectors and users e.g. heat units for agriculture or wave heights for managing coastal shipping. Without translation into information that can be easily understood by users, the information is difficult to use for particular operational decisions.

Inconsistent use of different information sources across and within country borders: There is currently no clear legal mandate for the issuance of warnings. As a result, with multiple sources of information, messages may be confusing and not acted upon. It is therefore necessary to have an official process for generating warnings that include communication with sectoral ministries and communities where disasters are experienced. Meanwhile, calculating risks for known vulnerabilities requires a comprehensive archive of information related to vulnerable communities, infrastructure, roads, shipping, access to markets, flood prone areas, cropping patterns etc. This information is currently held in disconnected databases or computers spread across different government departments and ministries. All the information required to assess vulnerability and calculate risks needs to be accessible, either through a central database/repository, or through distributed network.

No systematic forecasting of climate hazards, analysis of risks and timely dissemination of warnings and climate risk information: Communication and data processing facilities for meteorological data and derived products are currently not available due to a lack of observing stations, computers and telecommunications equipment. Furthermore, weather and climate forecasts are not regularly produced within Guinea Bissau nor do they take conditions specific to Guinea Bissau into consideration (e.g. combining localized climate hazard information with information on localized vulnerability or environmental factors). Besides a lack of climate risk forecasts, there are no formal or official channels for the dissemination of these forecasts, associated warnings or response strategies that may be employed to mitigate any impacts.

Lack of environmental databases for assessing the risks posed by climate variability and change: The absence of a national environmental database reduces the potential to use weather and climate information for decision-making in different sectors that make up the Bissau Guinean economy. These include planning and investment decisions related to urban and rural development, infrastructure, health, transport, agriculture, and mining and water resources.

The baseline scenario and any associated baseline projects

Guinea Bissau embarked on a long-term process of economic development and social transformation after three decades of poverty and violence and aiming to achieve political stability through inclusive development, good governance and preservation of biodiversity. This is reflected in the adoption of the strategic and operational development plan “Guinea Bissau 2025” which aims at supporting the country to achieve by 2025 a green and sustainable economic and social transformation. To achieve this goal, the plan is organized around the following 5 pillars: i) improve the democratic governance; ii) ensure a sustainable management of natural capital and conservation of the biodiversity; iii) build a national network of modern and competitive infrastructures; iv) strengthen the human capital and improve citizen quality of life; v) build a strong private sector and a diversified economy. In the framework of this new development vision, the government with support of various donors and financial institutions has mobilized \$63M for the next 10 years.

The natural capital is one of the key asset for the Guinea Bissau economy development. The natural capital currently represents 47% of the wealth per capita in Guinea Bissau and the objective of the government is to increase this number. For this reason, the sustainable management of the natural resources (forests, lands and waters) is among the government’s top priorities. If the natural capital is one of the key asset on which the Guinea Bissau relies for alleviating poverty and promoting economic and social transformation, the poverty, associated with a poor and inefficient agrarian system, is also one of the key drivers of the natural resources depletion in Guinea Bissau. In order to address this driver, the government of Guinea Bissau has also identified as key priority the development of the agriculture sector. As part of the Guinea Bissau 2025, a number of investments and projects support infrastructure developments and the agriculture sector in support of the pillars listed above. Without the LDCF intervention the long term sustainability of these investments can be undermined unless climate risk information is provided, early warning system delivered and relevant preparedness and adaptation capacities embedded into the relevant institutions responsible.

However, the Guinea Bissau meteorological network is old, degraded and made up of diversified brands, which makes it difficult to ensure network connection and equipment maintenance. Today, there are only four Meteorological stations (Bissau Airport, Bissau Centre, Bolama-Bijagós, Bafatá e Gabú) that are functional with very limited operational capacity. Indeed, because of budget constraints, the hydro-meteorological stations are no longer functioning properly. Given the current economic difficulties facing the country, the National Meteorological Service has only very limited means of operation and a virtual absence of investment resources. The National Meteorological Service of Guinea Bissau currently operates with support from the national budget of the Government through the Ministry of Social Equipment. The national allocation budget only covers the salaries of officers and technical staff members. Despite past support from West Africa Agricultural Meteorology Project (METAGRI) and the Post Conflict and Natural Disasters Countries project (EMERMET) funded by Spain, the technical technical and institutional capacity and the equipment procured were not sufficient to reach the capacity levels required to generate climate information and early warning products necessary for addressing communities livelihoods vulnerability and the efficient addressing of climate challenges for economic growth and sustainable development in Guinea Bissau.

Rural communities and their agro-pastoral practices remain highly vulnerable while agro-meteorological information and support to farmers is currently non-existent or ineffective. Additionally, the local and decentralized institutions in charge of supporting the meteorological stations in the collection and analysis of climate change information do not have the necessary capacity and are not properly coordinated to formulate and disseminate relevant agro-meteorological information and advisories.

Guinea Bissau adopted a national disaster risks management strategy. The objectives of this strategy are: i) increase political commitment to the reduction of disaster risks; ii) improve the identification and assessment of disaster risks; iii) strengthen the knowledge management related to DRR; iv) increased awareness of disasters risks within the population; v) enhance the governance of institutions involved in DRR, and vi) mainstreaming DRM in the development strategies and plans. Although this strategy was an important step for DRM in Guinea Bissau, it is necessary to integrate the strategy with climate change management in Guinea Bissau. This strategy has not yet been implemented until recently because of lack of financial resources. The required policy, institutional and regulatory frameworks to enable risk informed decisions is currently absent partly due to described limitations in required infrastructure and capacities.

Baseline investments

The Government received a loan and grant for a Rice Value Chain Development Project designed to ensure sustainable recovery of the rice value chain in two regions by improving productivity, strengthening infrastructure, ensuring resilience to climate change, managing natural agricultural resources in a sustainable manner and reducing gender inequality. The project, worth US \$6.13 million started implementation in 2018 and is due for completion in December 2020.

In 2017, China provided a grant worth US\$ 26 million for the second phase of construction of a fishing port in Bissau for the development of the fisheries industry in Guinea-Bissau. Construction was announced for 2018, aiming for completion in 2020.

The Government received a loan and grant from the IFAD for an Economic Development Project for the Southern Regions. With a budget of 18,99 millions US\$, the project started in 2015 for a 6-year period until 2021. The project includes community development and microfinance activities, but its main focus is on infrastructure and promotion of rice production, including through the rehabilitation of mangrove swamps for the purpose of rice production.

Finally, the World Bank is considering a US\$ 15 million investment in rural infrastructure (tentatively entitled Rural Transport Project (RTP)) to improve the physical access of the rural population to markets and essential services in selected areas, as well as, provide better responses in the event of crisis or emergencies. The project is envisaged to have a component focusing on transport infrastructure and another one on support to transport sector institutions. This project follows previous investments from donors and development banks in road rehabilitation and construction and can benefit from strong weather-based information and early warning.

These initiatives are vulnerable to climate change and there is a need to increase the access to relevant climate information and early warning products necessary to prevent and manage the climate risks for these projects and in general terms address the climate challenges for food security and the economic growth and sustainable development. However, the current levels of human and technological capacity does not allow the DNM to provide the relevant climate information services necessary to prevent and manage the impacts of severe weather disasters and medium- to long-term climate related risks for development of the rice and other food value chains. The climate information services provided by the DNM are currently limited to short-term meteorology information such as agricultural calendars and the daily and monthly meteorological bulletins for the monitoring of the agricultural season and the monitoring of the meteorological conditions favorable to bushfire. Indeed, the baseline scenario consists of low capacities and means for collecting climate data and undertaking analytical work on climate change and variability. Spatial density of meteorological stations is currently low. Means and capacities to produce and disseminate appropriate seasonal forecasts and longer-term climate change projections tailored to the needs of farmers, fishers and decision makers are weak.

The proposed alternative scenario, with a brief description of expected outcomes and components of the project

With the LDCF financing, the project will add to the baseline by strengthening the climate monitoring capabilities, early warning systems and information for responding to climate shocks and planning adaptation to climate change in Guinea Bissau.

Component 1: Transfer of technologies and building operational human capacity for strengthening climate and environmental monitoring capacity

Under this component of the project, the Government of Guinea Bissau will be able to use LDCF resources to procure, install and/or rehabilitate critical climate information infrastructure required to build and/or strengthen the observational network. In all equipment purchases, an assessment of existing equipment will be made, noting the manufacturer, status and critical gaps in density. This will need to be weighed against the costs of potentially cheaper solutions and the added costs of training personnel to service different products. This component will build on the work undertaken through the METAGRI, EMERMET and as detailed in the baseline projects listed previously and coordinate with the GoGB/UNDP/LDCF project “Strengthening adaptive capacity and resilience to Climate Change in the Agrarian and Water Resources Sectors in Guinea-Bissau”.

Building upon the baseline projects mentioned above, the LDCF funds will be used to procure and install appropriate infrastructure, to enable a minimum network density for improved observation, generation of climate information and a functioning EWS. In the context of climate change and variability, access to and understanding of agro- and hydro-meteorological information is a prerequisite for disaster risk reduction, agriculture productivity and adaptive agro-sylvo-pastoral activities. These equipment are meant to support the Bissau Guinean National Meteorology Institute (INM), the Guinea Bissau Ports Authority, and the National Directorate of Hydrology to provide various groups, including farmers and decision makers with timely and quality hydro-meteorological information

and services. The project will ensure that the equipments purchased and the services delivered will be connected to and complete the coastal (terrestrial and maritime) weather measuring and forecasting equipment that will be purchased through the GEFID 6988 “Strengthening the resilience of vulnerable coastal areas and communities to climate change in Guinea Bissau” project currently at the PPG phase. The GEFID 6988 project pursues the following outcomes: i) the Policies, regulations, institutions and individuals mandated to manage coastal areas are strengthened to reduce the risk of climate change through different outputs (including the establishment of a coastal monitoring program and required weather measuring and forecasting equipments and capacity) that will provide up to date advices and information on marine meteorological and related oceanographic climate-induced dynamics affecting beach width and slopes, coastal line evolution, lagoon sediments, coral reefs, winds, wave’s height and strength, swells, tide levels, bathymetry, river flows, river water quality, ground water quality); ii) Vulnerability of coastal investments and assets (including fish landing facilities and the key mangrove forests and coastal forests networks, lowland rice growing areas, wetlands, etc) to climate risks reduced through the design, construction and maintenance of coastal protection measures and iii) Rural livelihoods in the coastal zone enhanced and protected from the impacts of climate change (through capacity building in climate resilient agriculture in coastal zones, climate resilient wetland and fisheries management strategies, livelihoods diversifications for communities including the oysters and shrimps harvesters, the strengthening of the operational and technical capacity of extension services to improve their support to agro-sylvo-pastoral and fishing communities.

The equipment purchased and capacity built with the resources affected to this outcome will help to provide the following services:

§ Early warning of severe storms and sea waves winds, flood events and drought periods in Guinea Bissau: this responds to a concern raised by rural stakeholders and aims to satisfy certain specific applications in agriculture and fishing, livestock, and forestry. These include, disaster risk reduction and DRR agro climatic zoning, the development of crop calendars, the monitoring of fodder resources for livestock, forecasting of favorable periods for early bushfires; early identification of heavy rains, storms and floods, and monitoring of headwaters and waterways, severe waves winds

§ Seasonal forecasts: the national meteorology system has currently two (2) forecast models. Two homogeneous zones (zone 1 and zone 2) have been identified from the indices of SST de NINO 3 and EOF3 which seem to give the strongest signals concerning rain in Guinea Bissau.

§ Production and diffusion of agro and hydro-meteorological information and advisories: this will allow farmers to access to and integrate hydrometeorological information in the management of their farms. This is necessary for the improvement of agriculture and the sustainable management of natural resources including water resources. Furthermore, national and regional forecast bulletins need to be produced by the National Institute of Meteorology (NIM) and diffused by the rural radios in local languages.

§ Details of this procurement will be further elaborated during the project preparation phase depending on the required types of EWS (e.g. for floods, drought, severe weather etc.), existing infrastructures and telecommunications, capacity to utilize the equipment and associated data and the necessity to collect the data according to GCOS standards and to share with the Regional and World Climatic Data Centers. Additionally, during the PPG phase appropriate locations will also be determined..

Under **Output 1.1** of the proposed project, LDCF resources will be used for the procurement and installation or rehabilitation (as appropriate) of 08 Tide Gauge Stations in Cacheu, São Vicente, Farim, Xitole, Saltinho, Tche-Tche, Cade and Bissau and 17 Limnigraphic stations in Bafatá Ponta Novo, Contuboel, Sonaco Aval, Sonaco Amont, Carantaba, Saltinho Aval, Saltinho Amont, Sintcha Sambel, Tche-Tche, Cabuca, Cade, Buccure, Bafata Portagem, Gabú. Ponte Pirada, Udumduma et Beli, with telemetry, archiving and data processing facilities. This will enable the NIM to monitor river and lake levels and to early identify dangerous floods before they occur, issue warnings for dam/transport managers downstream and alert communities at risk, but also manage the irrigation water resources. All stations will be fitted with appropriate means for relaying data to central servers, regional and world climatic data centers (e.g. via GPRS or satellite telemetry).

Under **Output 1.2**, LDCF resources will be used for the procurement and installation or rehabilitation of 40 meteorological monitoring stations, also with telemetry, archiving and data processing facilities. During the PPG phase, existing information on network coverage (integrating the stations currently being built or planned by the LDCF projects) and vulnerabilities to climate change will be used to identify underserved locations where data from additional stations will be most useful. Also, the PPG phase will determine how flood and drought early warning and monitoring will be improved. As early warning and up to date monitoring is a priority, Automatic Weather Stations (AWS) using GPRS mobile telecommunications will be prioritized and where this is not available the feasibility of using more costly satellite communications will be assessed (including implications for budgets and future running costs). In cases where the station has been neglected but the site (fences, towers etc.) is still functional, LDCF resources will be used to upgrade sensors and data loggers, as historical observations from the site can be used with newly acquired data to create longer time series for detecting climate changes.

Under **Output 1.3**, LDCF resources will be used to procure equipment for monitoring severe weather events that are expected to intensify with climate change. LDCF resources will be used to procure equipment and services for monitoring severe weather. However, radar equipment, which is typically used for doing this in developed countries, is costly (purchasing and maintaining the equipment, as well as training and paying personnel to operate it) and budgets will not allow for the purchase and maintenance of such items. Rather, a lower cost alternative technology using lightning data as a proxy for radar will be procured and installed. The PPG phase will clarify how data from this system will be used to provide real-time warnings of severe weather conditions and heavy rainfall warnings to public officials and the public to warn of potentially dangerous weather or flooding conditions. The system will allow for full coverage of the country, rather than rely on radar's limited range of detection.

Through the **Output 1.4**, LDCF resources will be used for the procurement and installation of maritime weather stations (made up of automatic weather station (AWS430), maritime observation console (MCC401), MetCast observation console (MCC301) in the 6 ports of Bissau, Bubaque, Cacinem Caio de Fora, Cacheu and Varela.

Through the **output 1.5**, the LDCF resources will support the procurement of site specific terrestrial and maritime weather forecasting systems that will provide 10 day weather forecasts for the 12 major towns throughout the entire country including the Exclusive Economic Zone of Guinea Bissau. This weather forecasting system will take local Bissau Guinean climactic conditions into consideration and output hourly data for at least the first three days of the forecast. To mitigate the risk of insufficient local IT resources and capacity to establish a sophisticated system like this, the use of cloud-based technologies will be explored during the PPG phase and the subsequent procurement.

Through the **Output 1.6**, the project will fund the Procurement and installation of satellite monitoring equipment to receive real time climate and environmental information critical to observe change. The potential uses of satellite data and imagery for planning and management purposes in the context of food security, and water management will be established based on country specific contexts, needs of users of information, (in the short-term disaster management, medium-long term planning) . If online data is not available in time to support required decisions, then satellite receiving equipment will be purchased and systems established to provide the required information.

Under **Output 1.7**, LDCF resources will be used to develop the human technical capacity required to maintain and use the equipment made available through the LDCF. Specifically, the project will support the development of required capacity to develop and run hydrologic models in order to provide improved forecasts to big water users such as the mining companies, the agriculture projects, and the national and regional authorities responsible for hydrological resources management to allow them to improve water management and mitigation of flood losses. Furthermore the project will support the development of capacity required to produce and disseminate marine weather forecasting (wind waves, ocean swells, sea water temperature, ...) . Personnel responsible for the running of the equipment and receiving/archiving the data that it produces (including manually operated stations where necessary) will be trained, along with back up personnel and replacements. This includes ensuring that there is an incentive mechanism in place to sustain the system that is set up with the LDCF resources. The training will stress that cost-effective technologies are utilized, which are able to interface with existing systems and which minimize dependence on external suppliers of hardware and software.

In summary, government needs that are relevant to Component 1 (to be developed in detail during the PPG phase) are:

- § Severe Weather and Flood Warning System based on a lightning detection network (purchasing, installation, training);
- § Terrestrial and maritime Automatic Weather Stations (purchasing, installation, training);

§ Coastal monitoring equipment (purchasing installation, training);

§ River gauging equipment (purchasing installation, training);

§ Terrestrial and Maritime weather forecasting system (purchasing, installation, training).

Component 2: Climate information integrated into development plans and initiatives, early warning systems and local communities decision makings pertaining to their livelihood options

Integrating climate information and early warning in the decision making process at all levels from the individuals to the policy makers has become a necessity of informed decisions in the face of climate change. In order to increase the effectiveness of warnings in the context of Guinea Bissau, it is necessary to improve the observation systems, forecasts at various timescales, the quality of climate information products and the ways they are delivered to the diverse users and disseminated for a broad access. This component is primarily concerned with improving these aspects of the climate information and EWS. Specific details on the exact type of CI-EWS information and risk management tools (for flood warnings, agricultural extension advisories, weather index insurance, transport planning, ports management, fishing etc) will be determined during the PPG phase and additional actions designed to meet those priority needs.

The capacity to make and use seasonal climate forecasts will be developed through **Output 2.1**. This will link to ongoing activities at the NHMS and will ensure the capacity to run numerical weather prediction models and nowcasting, or be able to usefully generate and use data from these models run elsewhere within the region or at international centres. The data from these models should be linked to tailored products developed under output 2.4 and the decision processes in output 2.5. The gaps between existing forecasting and nowcasting systems and those required for climate resilient planning purposes will be evaluated during the PPG phase, including use of indigenous knowledge when useful. Data sharing with regional NHMSs will be encouraged as this helps develop forecast products nationally from weather systems inbound from other countries, and vice versa.

Output 2.2 will develop National capacity for assimilating forecasts and monitoring into existing development planning, PRSPs and disaster management systems, including coordination with systems and warnings developed by other initiatives.

Output 2.3 will assess the efficiency and sustainability of the current EWS and climate information production and dissemination system, taking account of the current funding mechanisms and allocated budgets. It will assess where funding shortfalls are most acute and where budgets are likely to be reduced in future. A comprehensive needs assessment for climate services will be carried out (how needs are currently met, opportunities for private partnerships and gaps in the current services), as well as the willingness and ability to pay for such services across a range of stakeholders, both public and private including the mining sectors and the Bissau port users

and the identification of the market barriers (unleashing of the market forces and development of the demand from the communities and the private sector) and solution to remove those barriers. Where suitable legal arrangements exist private sector engagement will be facilitated in a form of a public-private partnership with the DNM or associated entity. During PPG, similar activities within the country or broader region will be studied to learn from their experiences and establish the feasibility of such an arrangement for a long term financing of climate services.

Through the **Output 2.4**, new tailored products will be produced to serve the information requirements of users in different priority sectors, development strategies and policies and livelihood options including the baseline projects. In this framework, the PPG resources will be used to assess the key climate risks and vulnerabilities for the baseline projects (including their targeted beneficiaries and areas) and the required climate information products needed to prevent and sustainably address the climate challenges for the success of the baseline projects. Additionally, Guinea Bissau is engaging in the National Adaptation Planning (NAP) process and the NAP process and the PPG will allow to identify the key vulnerabilities and the priority sectors, development plans and locations for adaptation and climate information gaps. In this framework, the resources dedicated to the Output 2.4 will also support the development of appropriate climate information and early warning products for the priority sectors (including agriculture, fishing and livestock), locations including the coastal zones, the drought and the flood prone areas, and key development strategies through consultation with the intended users of the information and appropriate research organizations. A strong emphasis will be given to the required climate information products for the key food and cash crops as well as the early warnings of climate risks for fishermen. Furthermore, a particular attention will, also be given to the production of the climate products necessary to address the climate related threats for the management and expansions of the protected areas of the mangroves forests of the Rio Cacheu, Orango islands of the Bijagos archipelago, Cufada lagoons, the forest of Cantanhes and Dulombi, the coastal areas. In the same objective, this outcome will also target to develop the climate information and EWS products necessary for the mainstreaming of climate risks in the development policies targeted in the outputs 2.5 below. Furthermore, the output 2.4 will support the development of tailored climate information and early warning products for the local fishermen and farmers.

Building on the Output 2.4, and in coordination with the NAP process, the **Output 2.5** will support the revision that takes a full account of climate risks and adaptation strategies into the Guinea Bissau 2025 development strategy operational programs including the 4 programs of the National Agriculture Investment Program (PNIA), the Poverty Reduction Strategy Document (DENARP-II), the key sectoral development plans and strategies, and the local development plans. This output in coordination with the NAP process in Guinea Bissau will, as first implementation activities, review these strategies and policies and identify the required information to climate proof them. Information and data from the monitoring infrastructure (weather and hydrological stations, radar, and satellite monitoring) will be combined to produce new user-relevant information. As an example, satellite and weather station observations can be combined to derive a spatially continuous dataset and estimate rainfall for locations without meteorological stations. Using these data, the water balance for irrigation scheduling can be estimated for wider regions and these can be used as part of agricultural advisories. Improved availability of data to generate these products will also be implemented e.g. where important climate records

reside in paper format, they will be digitized and used to better describe local microclimates, hence improving the baseline hazard mapping. It is not clear which projects are currently undertaking this work and this will be determined during the PPG phase.

The **Output 2.6** will establish communication strategies and processes targeted to each identified sector and user and vulnerable areas. The aim is to effectively communicate early warnings, and advisory packages developed through Output 2.4, in the most useful way for different users/audiences. These strategies will vary as communications technologies, language and cultural norms vary and according to the targeted areas and beneficiaries. Using software and technology in innovative ways will be explored e.g. Google Earth for presenting forecasts and identified risks. Lessons and experiences in other parts of Africa will be assessed for their potential to upscale e.g. using innovative techniques to communicate agrometeorological advisories [11]. This will build on the work undertaken by GFDRR and UNDP. We will ensure that the services delivered, through this component, will be connected to and complete the coastal (terrestrial and maritime) weather measuring and forecasting and climate information that will be produced and disseminated through the GEFID 6988 “Strengthening the resilience of vulnerable coastal areas and communities to climate change in Guinea Bissau” project currently at the PPG phase

In summary, government needs relevant to Component 2 which will be developed further during the PPG phase, and in connection with the GEFID 6988 project are:

- § Access to satellite imagery and integration into development of EWS messages;
- § Integration of lightning data into severe weather warning messages and flood warnings;
- § Modelling and monitoring capacity built (terrestrial and maritime weather, hydrology, and coasts);
- § Simple and user-friendly messages are developed for distribution over mobile telephone networks and other channels;
- § Coastal, severe terrestrial and maritime weather, and flooding forecasts;
- § Integration of climate information in the Terra Ranka Development Strategy, including the 4 programs of the National Agriculture Investment Program (PNIA), and the Poverty Reduction Strategy Document PNIA, and the DENARP-II.

Component 3: Knowledge management and scaling-up strategy

Under Component 3, the project will develop, implement and monitor a M&E strategy to ensure that the climate resilient benefits (global, local and national) are monitored and assessed using appropriate tools and systems and the project records and disseminated

lessons learned for scaling-up locally and more widely to other development projects. Output 3.1. will set up an efficient monitoring and evaluation system, connected with the government national M&E system, and will include a wide-ranging set of activities and outputs to ensure that all project activities on the ground are appropriately monitored and assessed and the progress duly reported. A special attention will be given to the monitoring of the implementation of the project gender strategy. This will include participatory methods involving local farmers (including livestock farmers), fishermen and communities, women as well inter-agency collaboration with the relevant ministerial departments. Training will be provided to a range of stakeholders involved in the project including government officials at the municipal level who are directly involved on a day-to-day basis in decision-making on coastal, agriculture and marine development and activities. The progress reporting will include quarterly progress reports, the annual Project Implementation Report, the mid-term review, and the terminal evaluation. Output 3.2 will focus on setting up a knowledge sharing mechanism designed to ensure that the project benefits from lessons of past projects and shares its results and lessons learnt with others. Guinea Bissau will benefit from linking with the CIRDA countries projects. The UNDP and the GEF LDCF are supporting a set of NIM Climate Information and Early Warning System projects (12 at total) and a coordinating regional component (CIRDA) which has the objectives to enhance coordination among the 12 NIM projects, increase cost effectiveness and, most importantly, provide the 12 country projects with a regional network of technologies, a cohort of technical advisors and efficient knowledge management mechanism for experience and lessons exchange. The output 3.2. will link this project to the regional coordinating program (CIRDA), and through the knowledge management (KM) mechanism established by the CIRDA, this project will benefit from lessons and experiences from the 12 Country projects which are at a very advanced state of implementation. This KM mechanism will also allow this project to assess and document in a user-friendly form and share best and successful practices and lessons with relevant stakeholders and the other relevant initiatives in the region. The Output 3.3. will support the implementation of a wider public awareness of the benefits of the access of end-users to climate services. This public awareness will give a special focus to decision makers in order to convince them to consider climate information services as development priority and on the necessity for the government to dedicate national resources to the support the sustainable financing of the climate information and early warning system after the end of the project. The raising awareness will also target the communities, the private sector, the national development institutions and the civil society organizations to inform them on the available climate services and the benefits of using them.

Innovativeness, sustainability and potential for scaling up

One of the innovative aspects of this project is that it aims at putting in place a strategy for the sustainable financing of the operation, maintenance and upgrading of the climate information system it will contribute towards developing in Guinea Bissau. The LDCF proposal will work to support and pilot the feasibility of the emergence of a market for climate services in Guinea Bissau that will help the NIM to generate consequent revenues able to support the sustainability of the improved climate information and early warning system. For this purpose, the PPG will identify the key actions to implement for removing the technical barriers (such as strengthening the quality of the service supply), market barriers (unleashing of the market forces and development of the demand from the

communities and the private sector) and policy barriers as well as identifying other conditions for the long-term feasibility for leveraging private sector support for climate information services.

[1] AfDB, OECD, UNDP: Africa Economic Outlook - Guinea Bissau (2014)

[2] <http://www.unep.org/environmentalgovernance/Portals/8/documents/Guinea-Bissau.pdf>

[3] CIA, "Guinea-Bissau," The World Factbook, 2014

[4] International Monetary Fund (IMF), Guinea-Bissau: Selected Issues and Statistical Appendix, IMF Country Report 05/93 (Washington: IMF, 2005).

[5] Gordon McGranahan, Deborah Balk, and Bridget Anderson, "The Rising Tide: Assessing the Risks of Climate Change and Human Settlements in Low Elevation Coastal Zones," *Environment and Urbanization* 19, 1 (2007): 17.

[6] *Conflict, Livelihoods, and Poverty in Guinea-Bissau*, ed. Boubacar-Sid Barry (Washington: World Bank, 2007): 62.

[7] *Ibid.*

[8] Kerry.H. Cook and Edward. K. Vizy, "Coupled Model Simulations of the West African Monsoon System: 20th and 21st Century Simulations," *Journal of Climate* 19, 15 (2006): 19.

[9] Joanna Davidson, "'We Work Hard': Customary Imperatives of the Diola Work Regime in the Context of Environmental and Economic Change," *African Studies Review* 52, 2 (2009).

[10] National disaster risks management strategy (2013)

[11] <http://www.rockefellerfoundation.org/what-we-do/current-work/developing-climate-change-resilience/grants-grantees/african-agriculture-climate-change>

1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.

A number of stations have already been identified during the PIF preparation and a detailed map will be prepared during the PPG phase. In addition to the stations listed below, a further 40 meteorological monitoring stations will also be installed and/or upgraded. The location of those 40 stations will be determined during the PPG phase based on priority taking into account the network coverage and vulnerabilities to climate change to ensure that underserved locations can provide useful data for monitoring.

Table 1. Project locations with geo-referenced information

Site	geonames.org ID	Type of station to be installed/upgraded
Bafatá Ponta Novo	2375254	Limnigraphic station
Contuboel	2373237	Limnigraphic station
Sonaco Aval	2369196	Limnigraphic station
Sonaco Amont	2369196	Limnigraphic station
Carentaba	2373639	Limnigraphic station
Saltinho Aval	2370214	Limnigraphic station, tide gauge station
Saltinho Amont	2370214	Limnigraphic station, tide gauge station
Sintcha Sambel	2369337	Limnigraphic station
Tche-Tche	2373421	Limnigraphic station, tide gauge station
Cabuca	2374354	Limnigraphic station
Cade	2374280	Limnigraphic station, tide gauge station
Buccure	2374562	Limnigraphic station
Bafatá Portagem	2375254	Limnigraphic station
Gabú	2372532	Limnigraphic station
Ponte Pirada	2370750	Limnigraphic station
Udumduma	2372818	Limnigraphic station
Beli	2374973	Limnigraphic station
Cacheu	2374311	Tide gauge station, maritime weather station
São Vicente	2370573	Tide gauge station
Farim	2372647	Tide gauge station
Xitole	2368657	Tide gauge station

Bissau	2374775	Tide gauge station, maritime weather station
Bubaque	11287490	Maritime weather station
Cacinem Caio de Fora	11287493	Maritime weather station
Varela	2368685	Maritime weather station

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Indigenous Peoples and Local Communities

Civil Society Organizations

Private Sector Entities

If none of the above, please explain why:

In addition, provide indicative information on how stakeholders, including civil society and indigenous peoples, will be engaged in the project preparation, and their respective roles and means of engagement.

The project preparation phase will be coordinated by the National Institute of Meteorology (NIM), which will likely also be the main implementing partner for the project preparation phase. Also, the identification and assessment of the climate information needs will be co-implemented with key CSOs, NGOs, CBOs that have a long experience in supporting rural development, climate risks assessment and climate change management. This will also include research organizations such as INEP, IBAP and the other key potential users of the climate information namely the vulnerable communities, the private sector (mining companies and Bissau port users). State Secretariat of Environment and Tourism - Directorate General of Environment ; Ministry of Agriculture - State Secretariat for Food Security; Ministry of Interior - National Civil Protection Service ; and Ministry of Health - Directorate General of Health. For the implementation phase prior consultations with the Government of Guinea Bissau have revealed that the NIM will probably be the main implementing partner and will implement the project in close collaboration with State Secretariat of Environment and Tourism - Directorate General of Environment; Ministry of Agriculture - State Secretariat for Food Security;

Ministry of Interior - National Civil Protection Service ; and Ministry of Health - Directorate General of Health. The project implementation phase will also involve the University of Guinea Bissau. Stakeholders participation in the project implementation phase will be further determined during the project preparation phase and outlined in the documents submitted for CEO endorsement.

3. Gender Equality and Women's Empowerment

Briefly include below any gender dimensions relevant to the project, and any plans to address gender in project design (e.g. gender analysis).

During the project preparation phase, gender-based vulnerability assessments will be made in the different targeted villages and regions in order to point out the specific climate information needed to address gender related vulnerabilities. In the same line, the climate information needs assessment will give a special emphasis to identify the needs for vulnerable women and develop specific tools to allow their easy access to the information they need to strengthen their resilience to climate change. The results of this assessment will inform the identification and development of gender-sensitive adaptation measures and strategies to be supported by this LDCF in order to address the identified gender-related climate risks and vulnerabilities. These adaptation strategies will be technically specified (including the required specific capacity building and financial support) and their cost-effectiveness vis-a-vis alternatives approaches clearly demonstrated. All these required actions to address gender gaps will be organized and planned in a budgeted gender action plan that will be incorporated in the project implementation plan and detailed in the total budget. The design phase of the project will include consideration of gender specific indicators to regularly monitor and assess the achievement of the gender based expected results.

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment? Yes

closing gender gaps in access to and control over natural resources;

improving women's participation and decision-making; and/or

generating socio-economic benefits or services for women.

Will the project's results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Will there be private sector engagement in the project?

Yes

Please briefly explain the rationale behind your answer.

The project aims to provide an important boost to the climate and early warning systems, which will inform decisions made by the government for early advice and planning, but also support the private sector, encompassing the Civil Society Organisations and Community Based Organisations. Private actors increasingly rely on climate information to guide their business, investment and expansion plans. Those private actors are an important recipient of some of the activities, but are also seen as key for ensuring the long-term sustainability of the project. Developments on the meteorological network implemented in the past were not able to sustain their operation in the long term. Learning from those experiences and to avoid this situation, the project will, from the onset, look at various options for sustainable financing of operations by involving the private sector. This could be achieved through service agreements, tailoring of sector-specific advisory for planning, and public-private partnership. The needs assessment to be conducted will determine whether current needs are being met, what are the gaps, but also seek to determine opportunities for private partnerships and the willingness and ability to pay for certain services, or find solutions to remove barriers to using those services, including capacity development. The project will conduct a number of awareness activities, some of them targeting the private sector to make sure that they are informed on the available climate services and the benefits of using them.

5. Risks

Indicate risks, including climate change, potential social and environmental risks that might prevent the Project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the Project design (table format acceptable)

Risk	Level	Mitigation
Unavailability of requisite human resources and data	High	The issue of the unavailability of requisite human resources will be mitigated by recruitment of international consultants who will work closely with in-country counterparts and by targeted capacity building activities. Where possible, the acquisition of services, rather than complicated systems requiring high levels of IT capacity will be prioritized. Training activities of local personnel will also be part of all aspects of the work and the relevant institutions will be encouraged to expand the staff base if it is weak in particular areas.
Local IT and telecommunications infrastructure weak e.g. international bandwidth and local mobile telecommunications networks	Medium	The use of the mobile telecommunications network for observation network implementation will be prioritized since that infrastructure will, over time, provide the most robust power, communications, and security setup for the network hardware. Cloud-based services will also be used for computing systems to minimize this risk at the local, computer room level.
Insufficient institutional support and political commitments	Medium	The proposed project is strongly supported by Governments and other key stakeholders and development partners. The project, in conjunction with UNDP, will therefore take advantage of this opportunity to seek substantial support from the Governments and forge strong partnership with other development partners. Direct linkages to existing and planned baseline development activities implemented by government, securing of the necessary co-financing, as well as local buy-in will also minimize this risk. It will also be important to establish buy-in from all government departments early as the project will utilize data and information from a wide range of departments.
Work progresses in a compartmentalized fashion and there is little integration e.g. government departments refuse to share data and information	Medium	By ensuring that capacity is built across a range of departments and implementing ‘quick win’ measures early (developing products based on internationally available data), these issues can be mitigated.

Risk	Level	Mitigation
Non-compliance by primary proponents for the successful implementation of this project	Medium	Ensuring that the project is designed and implemented in a participatory and inclusive manner, following established UNDP procedures, will mitigate the risk. Since the activities correspond to the urgent needs as expressed by the primary proponents the risk of non-compliance should be reduced
Climate shock occurring during the design and implementation phase of the project	Low to medium	There may be some delays as more urgent priorities may need to be addressed by some of the stakeholders (e.g. NHMS or disaster management) but it is unlikely that this will derail the project.

6. Coordination

Outline the institutional structure of the project including monitoring and evaluation coordination at the project level. Describe possible coordination with other relevant GEF-financed projects and other initiatives.

The GoGB/UNDP/LDCF project “Strengthening adaptive capacity and resilience to Climate Change in the Agrarian and Water Resources Sectors in Guinea-Bissau” has rehabilitated and strengthened the Gabu Meteorological network. In this perspective the project has supported the installation of 6 automatic weather stations (AWS) and 10 rainfall stations data processing. The project support to the Government has contributed to (i) strengthen the capacity of the National Institute of the Meteorology (INM-GB) in the field of collecting and dissemination of meteorological information, (ii) improve INM-GB capacity to provide meteorological support to various social and economic activities in the North, namely agricultural production activities ; (iii) to build capacity of 40 officials from 16 keys line ministers on climate change mainstreaming methodology. The EWS to be installed through this LDCF proposal will be connected with the AWS and rainfall stations data processing installed by this ongoing project to form one integrated network. In the same vein, the capacity created in the framework of the previous UNDP LDCF project will be key element of the capacity building programme planned under this CI-EWS project. Indeed, they are expected to play the role of trainers during the rolling out of the capacity building program. For this reason, the project preparation phase will contribute to assess the capacity gap for them to play the role of trainers and propose solutions to be implemented during the first months of the project implementation to address these gaps. Additionally, the CI-EWS products and the capacity building activities of this LDCF proposal will also support the needs identified under the ongoing LDCF project “Strengthening adaptive capacity and resilience to Climate Change in the Agrarian and Water Resources Sectors in Guinea-Bissau” and that have been not addressed by this latter.

The coordination and the management arrangements will be defined in detail during the preparation phase of the project. Based on initial discussions with the Government of Guinea, the National Institute of Meteorology (INM) will ensure the overall coordination of

the project as the national main implementing partner (IP), and in close collaboration with the General Directorate of Environment, Directorate General of Hydrology, the National Directorate of Fishing, the National directorate of the disaster risks management, the Directorates of Infrastructures and land management. The INM which is the main implementing partner for Guinea Bissau of the EU-UNDP supported project “AMESD”, METAGRI and EMERMET will ensure the coordination of these aforementioned projects with this LDCF proposal. In the same perspective, the INM will coordinate with the National DRM institution to ensure a better coordination between DRM and climate change management in Guinea Bissau. The INM will also coordinate with the Ministry of Agriculture which is the main IP for the “Guinea Bissau agriculture development and food security project” to ensure the coordination of the proposals with the aforementioned project. In the same perspective, the INM will ensure a close collaboration of the IBAP, as main IP of the 2 projects “strengthening the capacity for the management of the environment and the forests” and “sustainable management of natural resources”, to ensure that the project implementation are in line with the 2 aforementioned projects. The INM will also ensure the full collaboration of the Directorate of Infrastructures in the project implementation which is the main IP for the investment program for the rehabilitation and constructions of roads.

7. Consistency with National Priorities

Is the Project consistent with the National Strategies and plans or reports and assessments under relevant conventions

Yes

If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc

The link between this project strategy and the NAPA is centered on a common goal of informing climate resilient development planning and sector management through improved national systems that generate relevant climate information. This project contributes to respond to the climate information needs for the four following priority sectors identified through the NAPA : Early warning and disaster management, Food security, water resources, and coastal/marine ecosystems. This project aims to equip Guinea Bissau with a functioning EWS system and a seasonal climatic forecast model in order to take appropriate actions to ensure climate resilient development. Its proposed outputs are the installation of a functioning EWS and CI model and the provision of appropriate climate information and necessary human resources to run the EWS. Additionally this project will set solid foundations for the successful implementation of the following INDC priorities: i) draw up a profile of Vulnerability & Resilience to climate change in the country; ii) preparation of contingency plans for the management of climate risks and natural disasters; iii) the increase the percentage of protected areas from 15% to 26% and ensure its management, iv) develop a national reforestation and sustainable management of forest and agro forestry ecosystems programme by 2025; v) the increase of the adaptation capacity of national

ecosystems through soil protection against water and wind erosion, and protecting the coast against rising sea levels and other types of erosion; vi) develop an Integrated Management Programme for the Coastal Zone by 2025; vii) introduction of farming techniques resilient to the effects of climate change.

8. Knowledge Management

Outline the Knowledge management approach for the Project, including, if any, plans for the Project to learn from other relevant Projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.

The UNDP and the GEF LDCF are supporting a set of NIM Climate Information and Early Warning System projects (12 at total) and a coordinating regional component (CIRDA) which has the objectives to enhance coordination among the 12 NIM projects, increase cost effectiveness and, most importantly, provide the 12 country projects with a regional network of technologies, a cohort of technical advisors and efficient knowledge management mechanism for experience and lessons exchange. As described in the component 3, This project will be linked to the regional coordinating program (CIRDA), and through the knowledge management (KM) mechanism established by the CIRDA, will benefit from lessons and experiences from the 12 Country projects which are at a very advanced state of implementation. This KM mechanism will also allow this project to assess and document in a user-friendly form and share best and successful practices and lessons with relevant stakeholders and the other relevant initiatives in the region. Furthermore, the project will seek to establish effective feedback mechanisms and knowledge management structures to deliver the optimum messaging to reduce people's exposure to risk and threats. This will also help ensure that resources are used most-cost effectively and that inefficient vehicles are not promoted throughout the project term—rather that the project activities can continually be re-adapted to serve the greatest number of people through the most effective messaging and delivery possible.

Part III: Approval/Endorsement By GEF Operational Focal Point(S) And GEF Agency(ies)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S): (Please attach the Operational Focal Point endorsement letter with this template).

Name	Position	Ministry	Date
Joao Raimundo Lopes	GEF Operational Focal Point	MINISTRY OF ENVIRONMENT	7/16/2016

ANNEX A: Project Map and Geographic Coordinates

Please provide geo-referenced information and map where the project intervention takes place

ANNEX B: GEF 7 Core Indicator Worksheet

Use this Worksheet to compute those indicator values as required in Part I, Table F to the extent applicable to your proposed project. Progress in programming against these targets for the program will be aggregated and reported at any time during the replenishment period. There is no need to complete this table for climate adaptation projects financed solely through LDCF and SCCF.

LDCF/SCCF Core Indicators at PIF Stage

[5443] [Guinea Bissau] [26 October 2018]

Select the indicator(s) most relevant to the given project. Enter data for the present stage, not for future stages. Note that the values will be manually transferred to the GEF Portal once possible; additional information (e.g. footnotes) will not be transferable to the Portal, therefore please refrain from providing such content here (better placed in the PIF/CEO ER).

LDCF/SCCF Core Indicator 1: Number of direct beneficiaries (gender-segregated, M/F)

	Number (expected at PIF)	Number (expected at CEO ER)	Number (achieved at MTR)	Number (achieved at TE)
Women	5,000			
Men	7,000			
Total	12,000			

Required of all UNDP-GEF projects. Please note that “direct beneficiaries” in this case are those that directly benefit from adaptation technologies, improved livelihoods, climate-resilient facilities/infrastructure, and those with significantly reduced vulnerability to climatic hazards due to new or enhanced early warning systems. It does not include recipients of trainings or awareness-raising efforts (which is captured by Core Indicator 4, below). It also does not include an entire community far downstream of an area where a riverbank protection measure has been installed/improved, or the entire group of people who have downloaded an early warning app on their phones (many of whom may not necessarily be vulnerable).

LDCF/SCCF Core Indicator 2: Number of hectares of land under climate-resilient management (hectares)

Ha (expected at PIF)	Ha (expected at CEO ER)	Ha (achieved at MTR)	Ha (achieved at TE)
N/A			

This indicator has been selected due to the large volume of LDCF/SCCF projects in the agriculture and food security sectors. If not relevant to the project, please omit.

LDCF/SCCF Core Indicator 3: Number of policies, plans and development frameworks that mainstream climate resilience

Number (expected at PIF)	Number (expected at CEO ER)	Number (achieved at MTR)	Number (achieved at TE)
10			

Please include regional, national, sub-national and sectoral plans that the project will mainstream adaptation in.

Name or Description of Policy/ Plan/ Framework	Scope	Status (actual at PIF)	Status (actual at CEO ER)	Status (achieved at MTR)	Status (achieved at TE)
National Agriculture Investment Program (PNIA)	Sectoral	Developed			
Poverty Reduction Strategy Document (DENARP-II)	National	Developed			
Sectoral development plans and strategies	Sectoral	Not in place			
Local development plans	Sub-national	Not in place			

LDCF/SCCF Core Indicator 4: Number of people with enhanced capacity to identify climate risk and/or engage in adaptation measures (gender-segregated, M/F)

	Number (expected at PIF)	Number (expected at CEO ER)	Number (achieved at MTR)	Number (achieved at TE)
Women	150			
Men	350			
Total	500			

This number may include government staff, communities and households, private sector workers, etc.

ANNEX C: Project Taxonomy Worksheet

Use this Worksheet to list down the taxonomic information required under Part I by ticking the most relevant keywords/topics/themes that best describes the project